Review Article

Medicinal characteristics and therapeutic application of Manna/ Taranjabeen (*Alhagi pseudalhagi*) in Unani medicine

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Abstract

Taranjabeen is the Unani name of a resinous sweet exudate obtained from the leaves and stems of a plant named camelthorn (*Alhagi pseudalhagi*). It belongs to the family Fabaceae and a native of Israel, Egypt, Syria, Arabia, north America etc. It has been used in the Unani medicine for the treatment of liver diseases, hyperbilirubinemia states, as an excellent laxative for children's, gastrointestinal diseases, joint pains, as blood purifier in various viral diseases such as chicken pox, measles, mumps etc. It is an important ingredient of many Unani formulations, hence worthwhile to revive this medicine through its comprehensive review of morphology, chemistry, temperament, pharmacognosy, pharmacological actions, dosage, adverse effect, correctives, alternatives and major formulations.

Keywords: Alhagi pseudalhagi, camelthorn, manna, taranjabeen, Unani medicine, Haj

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Introduction

There had been a lot of controversy for understanding the fact, which plant genus or species is actually responsible for the secretion of *Manna* and what *Taranjabeen* is? Since manna is also entitled in the Holy Quran and Holy Bible, therefore it increases the curiosity among botanists or scientists to collect correct information about *manna*. After a lot of researches, several botanists have given variable thoughts.[1, 5, 6]

Manna is strictly a generic term applied to the saccharine exudation from number of different plants belonging to various natural order. Basically *manna* is obtained from three different types of plants: the *Alhagi pseudalhagi (Haj* or Camelthorn), *Fraxinus ornus* (*Kaseeru*) and *Tamarix mannifera (jhao)*.[12, 13] Apart from the *Haj*, there was another plant called *Tamarix mannifera* or *Gazanjibin*, that grows in the same region and can be also a manna plant, a small tree with scaly leaves.[1, 5, 6]

The camelthorn is an important source of *manna* (*taranjabeen*) yields by some of the its species. Yet these species do not yield *taranjabeen* everywhere they grow, like the camelthorn does not yield any kind of sugary exudation in Arabia, Egypt, whereas this product is rather abundant in Persia and Bukhara. This phenomenon seems to be connected with certain temperature, soil conditions, and more importantly a kind of insects living on the plant are responsible to produce *manna*. These insects puncture the bark of the host plant through which a liquid oozes out during the intense heat of the sunny day and hardened in the form of a gum during the cool nights. These insects were identified as 'Croccus manniparus'. Alhagi does not yield any exudation because of absence of these insects in the species present in India, Egypt and Arabia.[1, 5, 6]

Botanical name:*Alhagi pseudalhagi*[1, 2, 3, 4]

Classification[1, 2, 3, 4]

Kingdom : Plantae
Subkingdom : Tracheobionata

Division	: Magnoliophyta
Class	: Magnoliopsida
Subclass	: Rosidae
Order	: Fabales
Family	: Fabaceae (Papilionaceae)
Genus	: Alhagi
Species	: Pseudalhagi

Synonyms of botanical name: *Alhagi camelorum*, *Alhagi maurorum*, *Alhagi persarum*, *Hedysarum alhagi*, *Hedysarum pseudalhagi*[1-5,7-10]

Common English names: Camelthorn, Camel thorn, Caspian manna, Persian manna[1-4]

Regional names[1, 2,5,8, 10]

Arabic : Aagul, Alhaju, Haj, Shoukuljamal,[1, 2, 5, 8, 10]Asale Haj,[11, 12, 13]Asakundiasma,[13]Asale Hind,[12]AsaleHawa,[13]Aakool,[12, 13] Asalulsamawi[13]

Baluchistan : Kahribuz, Shuthakhar[11-14]

Bengal : Dulallabha, Javasha[11-14]

Bombay : Jawassa, Jawassi[11-14]

Canarese : Balliturche, Toreyingalu[11-14]

Chinese : Tz'u Mi[11-14]

Cutch : Zuwasha[11-14]

English : Arabian manna plant, Camelthorn, Persian Manna plant,[1, 2, 5, 8, 10, 13] Manna of desert[11-14]

French : Agoul, Alhagi, Halhagi, Plante[1, 2, 5, 8]

Gujarati : Javsao[1, 2, 5, 8]

Hindi : Javansa, Javasa, Jawasa, Junwasa,[1, 2, 5, 8, 10, 11, 15, 16]shakarjawansa,[12, 17, 18, 19]Youashsharkada[13, 14]

Malayalam : Kappattumpa[1, 2, 5, 8]

Marathi : Jawas, Kas, Yawas, Kantechumbaka[1, 2, 5, 8]

Persian : Kharebuz, Kharishutr, Shutarkhar, Ushtarkhar,[1, 2, 5, 8, 10]Taranjabeen,[12,13]Persian[12, 13, 17]

Sanskrit : Adhikantaka, Ananta, Bahukantaka, Balapatra, Duramula, Roshnika, Kantaki, Yavasa, Vasanta[1, 2, 5, 8]

Sind : Kas, Kaskhandero, Usturkhar[1, 2, 5, 8]

Telugu : Girikarnika, Tellaginiya[1, 2, 5, 8]

Urdu : Athariyun, Farakiyun, Javasa[1, 2, 5, 8]

History

In the semitic language, 'Mann' means 'who' or 'what'. When people of Israel saw the white substance around trees, they simply asked each other 'mann'? what is it? It was saccharinous food, which Allah provided to the children of Israel when they were wandering in the Sinai desert after exile from Egypt. This plant has been referred with Salva bird or Quail eaten with the *manna* during 40 years (1491 BC to 1451 BC) as a balanced diet.[1, 5, 6] Some people use *taranjabeen* as a synonym with *manna*. In Unani medicine, 'manna' is a collective term to denote sweet resinous exudate obtained from leaves and stems of three plants namely[12, 13]

a) *Fraxinus ornus*(*Kaseeru*)
b) *Alhagi pseudalhagi* (*Haj/ Jawansa*)
c) *Tamarix gallica (Kaz-mazajjhao)*[12, 13]

Unani literature resolved the confusion by stating that *taranjabeen* is specifically called a resinous exudate obtained from *Haj/ Alhagi pseudalhagi*.[12, 13]It was named *taranjabeen* (a Persian word) which means 'moist honey' owing to its resemblance and sweetness to honey.[12, 13]It is also known as *asalulsamawi* (honey of the sky) and *asalulhawa* (honey of air) because of its dew drops appearance on the leaves in the morning. It is also known by the name of 'youassharkada' which means sugar of *jawansa*. Some people also called it "oontkatara" which means camelthorn.[12, 13]

The sweetness and nutritional value of *taranjabeen* have led some authors to believe it to the miraculous *manna*,

which sustained the Israelites during these forty years of journey in the wilderness of Sinai.[1, 5, 6]

In the Islamic period, the earliest description of the *Haj* as the source of *taranjabeen* and of the medicinal properties of *taranjabeen* is "It's a dew resembling honey, solid and granulated. It occurs often on the *Haj* and it is grown in the Syria and Khorasan."[1, 5, 6] Its name "manna" is also mentioned in "Surah Baqrah" of Holy Qur'an.

In Unani medicine, secretion and formation of *taranjabeen* had been under conflicts by different Unani scholars. *Yusuf Bin Umar Ali Rasul Gasani*, *Najmul Ghani*, *IbneSina*, *IbneBaitar* and *IbneRushd* have stated that *taranjabeen* is a liquid which resembles honey and found in semisolid resinous form and is also called as "Asale Hindi".[12,13, 19, 29, 34]*Najmul Ghani* mentioned by the cross reference of "Antaki" that it is dewdrop which falls on the plant named "Aakool" and turned into *taranjabeen*. *Moalif Burhan Qatae* stated that one day in the morning, *manna* rained like a snow on the community of *Hazrat Musa Alaih Salam*.[20] 18th century scholars of Unani medicine such as *Hakeem Kabiruddin*, *Hakeem Ram Lubhaya*, *Hakeem Hari Chand Multani*, *Hakeem Safiudddin*, *Hakeem Muhammad Hassan Nigrami* and *Hakeem Muhammad Rafiquddin* have mentioned in their respectable books that it is a resinous exudate which deposit on the leaves and stems of plant *Jawansa* like a dewdrop.[20]

The sweet *manna* is still traded over the world, but manly used in the medicine since it has medicinal as well as nutritional properties.[1, 5, 6]

Distribution and control

The native range of camelthorn extends from India and southwest Asia to North Africa. It has spread to many parts of the world including South Africa and Australia. It is also distributed in the states of Washington, California, Nevada, Utah, Arizona, New Mexico, and Texas. It occurs first in the semi-arid areas and later establishes and thrives under irrigation. In California, camelthorn has been found in southern Sierra foothills, the Mojave and Colorado deserts, and throughout the Central Valley. In the Arizona, dense thickets have formed along the Colorado River in the Grand Canyon and along the little Colorado River.[1,2, 3, 4, 5]

The weed was first reported in the California in 1915, near Mecca in Riverside country. Camelthorn was declared a noxious weed in alfalfa fields in California's imperial valley in 1921s and extensive efforts to control the plant were initiated, although eradication efforts have eliminated all but three infestations in Tulare, San Bernardino and Inyo have still infested with camelthorn.Camelthorn is designated as a "List A" species on the Colorado Noxious Weed Act. It is required to be eradicated wherever found in the State.[24, 26]Lack of favorable moisture and soil temperature at the same time prevented establishment of camelthorn planted at several locations. Eradication resulted from treatment with 2,3,6-trichlorobenzoic acid (2,3,6-TBA). Three repeated sprays with esters of 2,4-dichlorophenoxyacetic acid (2,4-D) within a growing season gave control; however, control did not appear to be directly related to depletion of reserve foods in the roots.[25, 26]

Main hosts of Alhagi are *Brassica rapa* subsp. oleifera (turnip rape), *Medicago sativa* (lucerne), *Pennisetum glaucum* (pearl millet), *Triticum aestivum* (wheat) and all the species of them.[26[

Propagation and phenology

Camelthorn reproduce mostly by vegetative clones from rhizomes, occasionally from seed. Plantsusually doesnot flower until they are at least one year old. Flower appear in June and fruits in July, but summer rains or irrigation can extend the flowering season later into summer. Flowering also varies with environmental conditions. In dry, exposed conditions, a single camelthorn plant produces 790 to 4,150 flowers. However, in moist or shady conditions camelthorn may not flower at all. The percentage of flowers that develop into viable fruits is low. Seeds pods ripens in July. Seeds may remain viable in the soil for many years because of the hard, thick seed coat.[3, 4, 26] [Figure 1]

Germination requires adequate soil moisture and warm temperature. Optimal seed depth for germination is 1cm below the soil surface. Exposure to sunlight inhibits germination. Seeds have a higher probability of germination, seedling growth, and survival, if soil moisture and temperature are higher.[3, 4, 26]

Passing through herbivore digestive tract or acid scarification appears to stimulate germination. Seedling root growth is rapid while seedling shoot growth is slow. Leaves require up to 3 months to develop. In six month-old plants, the ratio of root to shoot is about 2.5:1. Vegetative growth is the most important means of spread. Small portion of the rootstock are capable of giving rise to new plants. This allows camelthorn to survive in situations of intensive erosion (such as along riverbanks) by re-sprouting from underground perennating seeds.[3, 4, 26]

Camelthorn has a vigorous root system that is able to tap into a water table up to fifteen meters below the soil surface. This allows camelthorn to survive in the areas of little rainfall and high water table such as saline meadows, sandbars, playas, riverbanks, irrigations canals, and irrigated croplands.[3, 4, 26]

Leaves: The plant, which is greyish green and hairless, has simple, entire leaves that are alternately arranged. The leaf shape is oval to lance-shaped. The small pea-like flowers are pinkish purple to maroon and are borne on short, spine-tipped branches that arise from the leaf axials.[3, 26, 35, 36]

Fruits: are reddish brown indehiscent pods, 0.4-1.2 inch (1-3cm) long, each containing 1-5 (or more) seeds. Pods strongly constricted between seeds to resemble string of beads, with the end of pod narrowed to a short beak.[1, 3, 4, 5]

Seeds: are kidney shaped smooth textures about 3mm long and 2.5mm wide and resemble large clover seeds, about long, dark brown to yellowish or greenish brown with dark mottling; notched at the scar, commonly lighter at notch.[1, 3, 4, 5]

Roots: extensive root system consisting of both vertical and horizontal roots extend to 6 ft (2m deep) and 26.5 ft (8m) laterally. Aerial shoots are formed on horizontal branches.[1, 3, 4, 5][Figure 1]

Exudation: a sweet sugary exudation, called as "Taranjabeen" is obtained from the plant known as *Alhagi pseudalhagi* (*Haj*). According to the statement of *Ibn Sina* and *Ibne Baitar* "Taranjabeen" is a dew falls mostly in Khorasan and in Transoxiana, and occurs most frequently on the *Haj*.[1, 3, 4, 12, 13] Khorasan is located in the Iran where plant named *jawansa* is found. *Jawansa* is a synonym of *Haj*. Alhagi does not yield any exudation in India due to absence of such insects and being traded from Iran.[12, 14, 28, 29, 34]*Ibne jazar* stated from the reference of *Ibne Baitar* that the exudate is obtained from "khurma" plant located in the place called *Kustila* of Africa.[12]*Hakeem Kabiruddin* reported that it is also obtained from plant named "Jhao".[19] As per Materia Medica, it is also found around the banks of Jamuna.[13]

Taranjabeen (moist or fresh honey and honey of the rose) is a semiliquid resinous compound substance exuded by the leaves and branches of the *manna*-yielding Alhagis, in the summers during night, must be gathered during the early hours of the morning. It hardens in the form of white granules. It is gathered by shaking it from the dried cut-off bushes into a large cloth and then by winnowing the grosser leaves, thorns etc., from it. That is the reason why the *taranjabeen* in the market is usually mixed more or less with impurities. Whatever quantity of manna, still adheres to the bushes is separated by dissolving it in the water, straining this water, and then evaporating it to the consistency; this kind of *taranjabeen*, which occurs in small agglutinated masses is however considered an inferior quality. The choicest *taranjabeen* is white one from Khorasan.[1, 3, 4, 11, 14, 17, 18]

As per Unani medicine, the color of *taranjabeen* could be either greenish stained if appear on the leaves or reddish stained if appear on the flowers.[11, 14, 34] There are a lot of variability in color reported by different Unani scholars which is mentioned in the table 1 below.

As per *Hakeem Najmul Ghani* and *Ibne Baitar, taranjabeen* found in the Khorasan which is moist and whitish in color which has less leaves and thorns is best in quality and it is medium in the temperament between its hotness and coldness.[12, 13, 29, 34] Some Unani scholars suggests that better *taranjabeen* is found in Samarqand.[13]

Taranjabeen still constitutes an export article of Iran. The latest official statistics indicates that in 1986, 87,54000kg were exported to Austria for a total value of RIs 10.8 mill. *Taranjabeen* only an indigenous laxative or purgative which is indeed the property to which owes its reputation in the east.[1, 3, 4]

Stability/ shelf lifeas per unani medicine: leaves-2 years and *taranjabeen*-5 years.[11, 13, 18]

Artificial *taranjabeen*: It is prepared from rock-candy. It is felt hard, rough and grunter on chewing. It can be differentiated from artificial one by its appearance of whitish reddish stained. The granules are light and sweet but not so good in taste with little foul smell. Flowers and thorns are also seen in it.[11, 13, 18, 28,34] When real *taranjabeen* is dissolved in warm water, little oiliness appears on the top.[13]

***Tasiri* name:** In Unani medicine, drugs are classified as per their dominant effect between used as a drug (*dawa*) or diet (*ghiza*). *Taranjabeen* is referred as *Ghizai dawai zulkhasa* (which means it is more a diet than a drug and *zulkhasa* means its mechanism of action is unknown as per Unani concept).[27]

Mechanism of action as per Unani medicine: Through its different pharmacological actions, *taranjabeen* benefits in various diseases and ailments. According to Unani medicine, laxative (*tal'een*) nature of this drug helps in relieving constipation, eliminations of the *safra* (yellow bile) in condition of *safra* dominance and also in relieving fever. The detergent/ cleanliness (*jila*) property accentuates its usage in various skin diseases and nutritive (*taghziya*) nature helps in combating weakness of chronic diseases.[27]

Temperament (*mizaj*): The theory of temperament in Unani medicine conceptualized that each drug possess four qualities in different proportions, i.e. *hararat* (heat), *buroodat* (cold), *yaboosat* (dryness) and *rutoobat* (moisture). The interaction between these qualities in different proportion leads to development of an overall temperament (*Mizaj-e-advia*) which defines the constitution and action of the drug. In Unani medicine, temperament of the drugs carries an important aspect while choosing drug for treatment of a particular diseases.

There is variability in temperament of *taranjabeen*, proposed by different scholars**: [**Hot Wet (*Har Ratab*)**]**[13,12, 19, 27]or [toward Hotness (*Mayil ba hararat*)][11, 12,13, 18, 20, 29,30]or [**(**Hot Dry (*Har Yabis*)][14]

Chemical composition

Plants: tannins (highest in fruit and roots), flavonoids (highest in leaves), coumarin derivatives, ascorbic acid, mucilage, essential oil.[1]

Twigs: contain alkaloids, N-methyl-â-phenethylamine, N-methyltyramine, hordenine, 3,4-dihydroxy-â-phenethyltrimethylammonium hydroxide, 3-methoxy-4-hydroxy-â-phenethyltrimethylammoonium hydroxide, N-methyl-mescaline, salsolidine, choline and betaine in small amount.[1]

Roots: contain the same alkaloid but in poorer quantity. Quercetin, gum resin, wax, coloring matter etc.[1]

Manna: water, sucrose, melizitose, reducing sugar, ash, impurities etc.[1, 3]

Two new flavanone glycosides, alhagitin and alhagidin have been isolated from the whole plant of Alhagi pseudalahagi and their respective structures by chemical and spectroscopic methods: naringenin 5-methyl ether 4'-glucoside, hesperitin 7-galactosyl (1à2) [rhamnosyl (1à6)] glucoside.[3]

The active principles of *Alhagi pseudalhagi*: beta-phenethylamine, tetrahyroisoquinolone bases.[3]

Part used:whole plant and *manna* (*taranjabeen*).[1, 3, 4, 5,

[10] It is available in the form of powder in the market.

Pharmacological actions

Plant:

a) Laxative[1, 2, 5, 7, 10]
b) Diuretic[2, 5,8, 10]
c) Anti-bilious[1, 2, 5,8,21]
d) Antiseptic[1, 5]
e) Cardiotonic[22]
f) Expectorant[1, 2, 7, 8, 10]
g) Antiemetic[1, 2, 5]
h) Nutritive[1, 2, 5, 7, 8, 21, 22]
i) Antipyretic[1]
j) Diaphoretic[1, 5, 7, 8]
k) Refrigerant[1, 5]
l) Anti-asthmatic[1, 2, 5]
m) Aphrodisiac[5]
n) Appetizer[8, 22]
o) Antirheumatic[21]
p) Aperient[2, 5]
q) Digestive tonic[1]
r) Demulcent[2, 5]
s) Cholagogue[1, 2, 5, 7, 8, 21, 22]
t) Refrigerant[1, 2, 5]

Manna: [Table 2]

Pharmacological uses

Plant:

a) Expel bilious humour (*safra*) from liver in case of hyperbilirubinemia,[13, 15]
b) Due to its detergent action, it can be used for diseases of the skin,[1, 2, 5, 7, 8, 27]
c) Due to its sweet nature, it is an excellent laxative for childrens,[15, 18]
d) Used with purgatives for synergistic action,[11, 12, 13, 14, 19]
e) Better laxatives for weak and chronic disease individuals,[11, 13, 27]
f) Tuberculosis fever,[13, 15, 27]
g) Removes “vata”, “kapha”, excess of fat,[13, 15, 27]
h) Cures brain infections,[13, 15, 27]
i) Leprosy,[13, 15, 27]
j) Chronic cough,[13, 15, 27]
k) Bronchitis,[1, 2, 5, 7, 8, 12, 15]
l) Excessive thirst and improve appetite,[1, 2, 5, 7, 8, 12, 15]
m) Heal piles,[1, 2, 5, 7, 8]
n) Opacities of cornea,[1, 2, 5, 7, 8]
o) Hemicrania,[1, 2, 5, 7, 8]
p) Oil from leaves is used for rheumatism in the Konkan, the plant is smoked along with black datura, tobacco, and ajwain seeds as a remedy for asthma,[1, 2, 5, 7, 8]
q) The infusion has a diaphoretic action,[1, 2, 5, 7, 8]
r) Extract is used in bile, cough, leprosy, suspicion of mind,[1, 2, 5, 7, 8]
s) A decoction of the root is made and used externally for swelling, abscesses and put into water for bathing,[1, 2, 5, 7, 8]
t) A decoction twig is used for cough in children,[1, 2, 5, 7, 8]
u) Alkaline extract of shoot shows antibiotic activity against Micrococcus pyrogens,[1, 2, 5, 7, 8]
v) Seeds with kidney shape are used for treating kidney stones,[1, 2, 5, 7, 8]
w) Plant is mostly used for the treatment of asthma, coughs, bronchitis, skin diseases, piles and urinary troubles and[1, 2, 5, 7, 8]

x) The herb camelthorn, with its long record of versatility, would be a good candidate to test as an antiviral.[1, 2, 5, 7, 8]

Manna:

a) Purifies the blood, good in vomiting, small pox eruption, asthma, piles,[1, 2, 5, 7, 8]

b) It is also used as a demulcent in coughs,[1, 2, 5, 7, 8]

c) It is moderate (in hotness and coldness), laxative, useful against acute fevers, pectoral, and when dissolved in pear and jujube juice beneficial to hot-tempered persons,[1, 2, 5, 7, 8]

d) It is more detersive than sugar, alleviates the burning sensation in the acute fevers, quenches the thirst,[1, 2, 5, 7, 8]

e) As an aperient, it is usually mixed as a sweetener and additive with another purgative having an unpleasant taste and[1, 2, 5, 7, 8]

f) Used as substitute for sugar in Bukhara and Basra[1, 2, 5, 7, 8]

Other uses

a) The dried leaves are utilized by the village tanners as a depilatory agent in place of sulfide and lime in liming operations,[1, 2, 7]

b) The tanning of kips by a modified process using camelthorn gave leather comparable to the usual E.I tanned leather. The modified process is superior to the conventional process being used by the tanners in that it takes less time. Eliminates the foul smell and improves the color to desirable extent[1, 2, 7]

c) The twigs are much used for making cooling mats (tatties) used in northern India in the hot season and[1, 2, 7]

d) Plant used as fodder for camels and other animals.[1, 2, 7]

Dosage

a) Liquid drops: 2 drops twice a day[3]

b) Powder: 1-5g, three times a day[3], 3-6g[15], 5-10g,[14]

c) The single herb in the form of drops by steam distillation process by boiling 0.5 kg of cleaned shoots in 2 liters of tap water thereby gaining 500 ml.[3]

d) Syrup (*Sharbat*): 10mL-20mL[12]

Compound formulations in Unani mediicne

Itrifale kishneezi, sikanjabeen adoosa,[4, 13] *janam ghutti,*[17] *dawaul taranjabeen*,[11, 18, 15, 27] *matbookhe fawakha, matbookhe mamool, matbookhe mushily murakkab, majoon mus'hil banfsha, matbookhmunzij was mus'hil, fawakah alwi khan, matbookhe ustookhudus mus'hil, matbookhe ustookhudus munzij, matbookhe mulayin, maul shahtaraj, majoon banafsha, majoon rahat, matbookhe sagheer, majoon barae zauf ya kabz*[31, 32, 33] and *majoon alkali*.[11]

Adverse effects

People of hot temperament,[11, 34] chicken pox,[13, 15,18, 34]haematuria,[15, 34] bloody diarrhea,[15, 34] piles,[15] dysuria[34] and high grade fever.[34]

Corrective (*muslih*)

As per Unani scholars,due to its hot temperament, qust can cause certain side effects in individual of hot temperament or in certain disease conditions. Hence, Unani scholars also mentioned those drugs (correctives) to counterfeit those side effects. The correctives of *taranjabeen* are *zulalt amarhindi* (*Tamarindus indica*)[11, 13, 30, 34]*aloo bakhara (Prunus domestica)*,[13, 34]*unnab (Ziziphus sativa*),[11, 13, 34]*maulshaeer*(barley water),[13, 34]*aabe zeera* (water of soaked *Cuminum cyminum*)[34] and *maul jubn* (whey water).[34]

Alternative (*badal*)

During ancient times, unavailability of a particular drug (drug of choice) contributes to usage of a drug (alternatives) which has almost similar temperament and

actions likewise to the drug of choice. The alternatives of *taranjabeen* are *sheerkhisht*,[11, 30]*shakarsurkh*[30] and *ghzanghbeen*.[30]

Scientific studies

Antiprotozoal

Dhar et al., established the inhibitory activity of Alhagi against Entamoeba histolytica strain.[37]

Antibiotic/ antimicrobial/ antibacterial

Joshi et al., reported that the extract of Alhagi inhibit the growth of positive and negative gram-bacteria's such as Staphylococcus aureus and Escherichia coli *in vitro*.[38-41]

Antifungal

Ethanolic extracts of the leaves has showed potent antifungal activity against unicellular and filamentous fungiwith strong antifungal activitytoExserohilumturcicum and Bipolaris maydis.[42]

Antinociceptive

Atta et al., have substantiated antinociceptive activity of *Alhagi pseudalhagi* after oral administration of methanolic extracts of aerial parts (400 mg/kg) exhibited antinociceptive activity in acetic acid-induced writhing and increased latency time in the tail-flick test.[43]

Anti-inflammatory

Neamah et al., have reported that aqueous extract of the plant exhibited protection against free radicals mediated inflammatory diseases.[44]

Anti-ulcer

Amani et al., reported that the total extract (300 and 400 mg/kg) and two of the isolated compounds (chrysoeriol 7-O-xylosoid and kaempferol-3-galactorhamnoside,100mg/kg each) showed a very promising antiulcerogenic activity.[44]

Diuretic

The extract of *taranjabeen*, exhibited potent diuretic action and was effective in reducing the urine pH and crystalurea and can be used in UTI where diuretic action of *taranajabeen* along with maintenance the pH is the key to cure.[45, 46]

Anti-diarrhoeal

Atta et al., have reported that the alcoholic extract (200 mg/kg, orally) of the plant have anti-diarrheal activity in castor oil induced diarrhoea model which was due to blocking effect of the extract on calcium channel.[47]

Anti-urolithiatic

Marashdah et al., didn't report any stone dissolving property of *taranjabeen*. Hoewever, its antispasmodic and ureter-relaxing action helps in easy expulsion of stones from urinary system.[48, 49]

Anti- acetylcholinesterase and NADH oxidase activity

Ashraf et al., have reported Methanolic extract of the plant has been reported to have more than 50% inhibitionof acetyl-cholinesterase enzyme activity at 250 µg plant extract.[50]

Anti-oxidant

Proanthocyanidin isolated from the *Alhagi pseudalhagi* has been found to ameliorate phospholipids imbalance and decreased lipid peroxidation in experimental myocardial infarction in rabbits as per the observations of Bashirova et al.[51]

Disadvantage

Camelthorn is strongly competitive with other plants. Its rapid and aggressive growth allows it to compete both native vegetation and cultivated crops. Because of its rhizomatic growth habit, dense strands may form which are impenetrable due to spiny stems. It is especially troublesome in cereal and horticultural croplands, where repeated cultivation aids its spread. Specific problems in wildland areas are not well known.[1, 3]

Conclusion

Manna is a collective term to denote resinous honey-like sweet nutritious exudate obtained from three plants in Unani medicine namely *Alhagi pseudalhagi (Haj* or Camelthorn), *Fraxinus ornus* (*Kaseeru*) and *Tamarix mannifera (jhao). Taranjabeen* is specially called when this resinous exudate is obtained from *Alhagi pseudalhagi (Haj* or Camelthorn). *Alhagi pseudalhagi* is a native plant of Persia, Bukhara, Arabia, Egypt, Syria, India and southwest Asia to North Africa. It yields *taranjabeen* abundantly in Persia, Israel and Bukhara but in India and Egypt, it doesn't yield any exudate due to absence of specific insects, soil and temperature conditions. It has been used as a mild laxative, anti-tussive, anti-inflammatory, lithotriptic, cholagogue, concoctive of bilious humour, mild analgesic, sweetener, expectorant, anti-cold remedy, purgative, thirst reliever, anti-emetic, blood purifier, antibiotic, aperient, demulcent etc. It is commonly adulterated with rock-candy in market but can be differentiated by its appearance, smell, color and testing through dissolving in the water. *Taranjabeen* shows oiliness on the top of the water when dissolved unlike rock-candy. Alhagiis designated as a "List A" species on the Colorado Noxious Weed Act and required to be eradicated wherever found in the State.Nevertheless, *Taranjabeen* is traded around the globe due to its medicinal and nutritional properties, and an important medicine for treating various disorders in Unani system of medicine.

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